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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
ALCALA, JOSE H	

ART UNIT	PAPER NUMBER
2827	

DATE MAILED: 12/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/319,258	ASAI ET AL.	
	Examiner	Art Unit	
	José H Alcalá	2827	

-- Th MAILING DATE of this communication appears on the cover sh et with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 July 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12,22-27 and 44-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *6-8,11,12,27,46,47 and 49* is/are allowed.

6)☒ Claim(s) *1-5,9,10,22-26,44,45 and 48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. This final rejection is in response to the amendment filed on 7/26/03.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-5,22-26,44 and 45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In line 5, where it reads: "the conductor circuit", is not clear if the limitation is referring to both of the conductor circuits or to only one of them. Therefore, the same unclearness is found in the depending claims.

Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In line 5, where it reads: "the conductor circuit", is not clear if the limitation is referring to both of the conductor circuits or to only one of them. Therefore, the same unclearness is found in the depending claims.

Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission

amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: what is the exact location of the roughened layer. Is the roughened layer located inside the via-hole, or is the roughened layer located on "at least a part of the surface" of the underlayer conductor circuit. The claim language of lines 5-7 is not clear on describing where on the board is the roughened layer, and if there are more than one roughened layers. It is not clear what are the two alternative structures being claimed by the use of the word: "or". The two alternatives are interpreted to be:

1) A multilayer printed circuit board comprising a substrate provided with an under layer conductor circuit, an interlaminar insulating layer formed thereon and an upper layer conductor circuit formed on the interlaminar insulating layer, and a viahole connecting both the conductor circuits to each other, in which the viahole is comprised of an electroless plated film and an electrolytic plated film, and a roughened layer having a roughened surface formed by etching treatment, polishing treatment, or redox treatment.

2) A multilayer printed circuit board comprising a substrate provided with an under layer conductor circuit, an interlaminar insulating layer formed thereon and an upper layer conductor circuit formed on the interlaminar insulating layer, having a roughened surface formed by a plated film on at least a part of the surface of the underlayer conductor circuit connected to the viahole.

For examining purposes, the first alternative was the one considered.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 9 is rejected under 35 U.S.C. 102(b) as being anticipated by Nakamura (US Patent No. 5,517,758). As best understood by the examiner:

Regarding Claim 9, Nakamura teaches a multilayer printed circuit board (device of Figure 9B) comprising a substrate (reference number 91) provided with an under layer conductor circuit (reference number 93), an interlaminar insulating layer (reference number 94) formed thereon and an upper layer conductor circuit (top reference number 93) formed on the interlaminar insulating layer, a viahole (reference number 96) connecting both conductor circuits to each other, in which the viahole is comprised of an electroless plated film and an electrolytic plated film, and a roughened layer having a roughened surface (as inherently taught in column 9, lines 59-67, and column 10, lines 1-3).

The limitations reciting that the roughened surface is formed by etching treatment, polishing treatment, or redox treatment are product by process limitations, and have not been given patentable weight.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1,5,25,26,44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura (US Patent No. 5,517,758). As best understood by the examiner:

Regarding Claim 1, Nakamura teaches a multilayer printed circuit board (device of Figure 8B) comprising a plurality of interlaminar insulator layers (reference numbers 84) and conductor circuits (reference numbers 83,88), said printed circuit board being formed by laminating a first interlaminar insulating layer (reference number 84) on a conductor circuit (reference number 83) of a substrate (reference number 81) and forming at least a second conductor circuit (reference number 88), wherein the conductor circuit (reference number 88) is comprised of an electroless plated film and an electrolytic plated film (as taught in column 9, lines 25-27), and a roughened layer (top layer of reference number 4 as shown in Figure 1D) on at least a part of the surface of the conductor circuit, but fails to explicitly teach a second interlaminar insulating layer on the first interlaminar insulating layer.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to make a second interlaminar insulating layer on the first

interlaminar insulating layer, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. See St. Regis Paper Co. v. Bemis Co., 193 USPQ 8.

Regarding Claims 5,25 and 26, Nakamura fails to explicitly teach that the roughened layer is a plated layer of copper-nickel-phosphorous alloy. It is well known in the art to coat conductors with alloys of copper, nickel and other elements, to improve conduction and reduce oxidation of conductors. It would have been obvious to one having ordinary skill in the art at the time the invention was made to coat the conductors with alloys of copper, nickel and other elements in order to improve conduction and reduce oxidation of conductors. In addition, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding Claim 44, Nakamura as modified supra for claim 1, inherently teaches that the electrolytic plated film is formed on the electrolesss plated film (column 9,lines 25-27).

8. Claims 10,and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura (US Patent No. 5,517,758). As best understood by the examiner:

Regarding Claim 24, Nakamura as stated supra for claim 9, fails to explicitly teach that the roughened layer is a plated layer of copper-nickel-phosphorous alloy. It is well known in the art to coat conductors with alloys of copper, nickel and other elements, to improve conduction and reduce oxidation of conductors. It would have been obvious to one having ordinary skill in the art at the time the invention was made

to coat the conductors with alloys of copper, nickel and other elements in order to improve conduction and reduce oxidation of conductors. In addition, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding Claim 48, Nakamura as stated supra for claim 9, inherently teaches that the electrolytic plated film is formed on the electronics plated film (column 9, lines 59-67, and column 10, lines 1-3)).

9. Claims 2, 24, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura (US Patent No. 5,517,758) in view of Adlam et al. (US Patent No. 5,861,076). As best understood by the examiner:

Regarding Claim 2, Nakamura teaches a multilayer printed circuit board (device of Figure 8B) comprising a plurality of interlaminar insulating layers (reference numbers 84) and conductor circuits (reference numbers 83,88), said printed circuit board being formed by laminating a first interlaminar insulating layer (reference numbers 84) on a conductor circuit (reference number 83) of a substrate (reference number 81) and forming at least a second conductor circuit (reference number 88), wherein the conductor circuit (reference number 88) is comprised of an electroless plated film and an electrolytic plated film (as taught in column 9, lines 25-27), and a roughened layer (top layer of reference number 4 as shown in Figure 1D), on at least a part of the surface of the conductor circuit, but fails to explicitly teach a second interlaminar

insulating layer on the first interlaminar insulating layer, and that the surface of the roughened layer is covered with a layer of a metal having an ionization tendency of more than copper but not higher than titanium, or of a noble metal.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to make a second interlaminar insulating layer on the first interlaminar insulating layer, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. See St. Regis Paper Co. v. Bemis Co., 193 USPQ 8.

Furthermore, Adlam teaches that the surface of the roughened layer is covered with a layer of a metal having an ionization tendency of more than copper but not higher than titanium, or of a noble metal (Column 10, lines 11-29). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Nakamura and Adlam, in order to have the surface of the roughened layer be covered with a layer of a metal having an ionization tendency of more than copper but not higher than titanium, or of a noble metal, thus providing passivation properties to the device.

Regarding Claim 24, Nakamura as modified by Adlam, fails to explicitly teach that the roughened layer is a plated layer of copper-nickel-phosphorous alloy. It is well known in the art to coat conductors with alloys of copper, nickel and other elements, to improve conduction and reduce oxidation of conductors. It would have been obvious to one having ordinary skill in the art at the time the invention was made to coat the conductors with alloys of copper, nickel and other elements in order to improve

conduction and reduce oxidation of conductors. In addition, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding Claim 45, Nakamura as modified by Adlam, inherently teaches that the electrolytic plated film is formed on the electroless plated film (column 9,lines 25-27 of Nakamura).

10. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura (US Patent No. 5,517,758) in view of Akahoshi et al. (US Patent No. 4,970,107). As best understood by the examiner:

Regarding claim 3, Nakamura as stated supra for claim 1, fails to explicitly teach that the roughened layer is on at least a part of the surface inclusive of a side surface of the conductor circuit (reference number 88). Akahoshi teaches a roughened layer (reference number 14) on at least a part of the surface inclusive of a side surface of the conductor circuit (reference number 12). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Nakamura and Akahoshi in order to have the roughened layer on at least a part of the surface inclusive of a side surface of the conductor circuit, thus increasing the adhesion between the concuctor circuit and the insulating layer.

Regarding claim 4, Nakamura as stated supra for claim 1, fails to explicitly teach that the roughened layer is on at least a part of a side face of the conductor circuit

(reference number 88). Akahoshi teaches a roughened layer (reference number 14) on at least a part of a side face of the conductor circuit (reference number 12). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Nakamura and Akahoshi in order to have the roughened layer on at least a part of a side face of the conductor circuit, thus increasing the adhesion between the concuctor circuit and the insulating layer.

11. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura (US Patent No. 5,517,758) in view of Adlam et al. (US Patent No. 5,861,076), and further in view of Akahoshi et al. (US Patent No. 4,970,107). As best understood by the examiner:

Regarding claim 22, Nakamura modified by Adlam as stated supra for claim 2, fails to explicitly teach that the roughened layer is on at least a part of the surface inclusive of a side surface of the conductor circuit (reference number 88). Akahoshi teaches a roughened layer (reference number 14) on at least a part of the surface inclusive of a side surface of the conductor circuit (reference number 12). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Nakamura, Adlam and Akahoshi in order to have the roughened layer on at least a part of the surface inclusive of a side surface of the conductor circuit, thus increasing the adhesion between the concuctor circuit and the insulating layer.

Regarding claim 23, Nakamura modified by Adlam as stated supra for claim 2, fails to explicitly teach that the roughened layer is on at least a part of a side face of the conductor circuit (reference number 88). Akahoshi teaches a roughened layer (reference number 14) on at least a part of a side face of the conductor circuit (reference number 12). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Nakamura, Adlam and Akahoshi in order to have the roughened layer on at least a part of a side face of the conductor circuit, thus increasing the adhesion between the concuctor circuit and the insulating layer.

Response to Arguments

12. Regarding the Petition for Correction of Inventorship, the petition has not been yet considered nor approved by the office, accordingly the application has been examined and considered as stated above.

13. Applicant's arguments regarding the rejection of claim 9 under 35 U.S.C. § 112, second paragraph, as being incomplete for omitting essential structural cooperative relationship of elements, has been considered but are not persuasive. As stated supra in the rejection, the claim is unclear and incomplete regarding the metes and bound of the invention, and the structural cooperative relationship of elements due to the use of the word: "or". The two alternative structures, are not clearly established in the claim, therefore the claims have been interpreted as stated supra in the rejection.

14. Applicant's arguments filed on 7/26/03 regarding the rejection of claims 1,2 and 9 have been fully considered but they are not persuasive.

Applicant argues that Nakamura does not disclose a roughened layer on at least a part of the surface of the conductor surface. The examiner respectfully disagrees, and points out that Figure 1D of Nakamura teaches a conductor (reference number 4) having a roughened layer on the top surface. Therefore the argument is not persuasive.

Applicant argues that Nakamura does not disclose that the under layer 73 is produced from an electroless plated film and an electrolytic plated film. The examiner respectfully clarifies that the element identified in the rejection as the under layer is reference number 93, and not reference number 73. Furthermore, it is noted that the features upon which applicant relies (i.e., that the under layer is produced from an electroless plated film and an electrolytic plated film) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Therefore the argument is not persuasive.

Applicant argues that the rejection of claim 9, improperly only refers to viahole roughness, and that each and every limitation of the claimed subject matter must be addressed in an anticipation rejection. The examiner respectfully disagrees with the argument as presented by the applicant, and points out that the claim as rejected above under 35 U.S.C. § 112, is unclear, and has two alternative structures separated and differentiated by the use of the word: "or". In order for the anticipation rejection to be proper, the prior art has to teach at least one of the alternative structures being claimed.

In the rejection of claim 9, stated supra under 35 USC § 102, for examination purposes the first alternative structure was examined, and therefore it is proper that only the viahole roughness (taught by Nakamura in column 9, lines 65-67) is considered. Therefore the argument is not persuasive.

Applicant argues that Adlam does not overcome the deficiencies of Nakamura. The examiner respectfully disagrees, and points out that as stated supra in the rejection of claim 2, Adlam teaches that the surface of the roughened layer is covered with a layer of a metal having an ionization tendency of more than copper but not higher than titanium, or of a noble metal (Column 10, lines 11-29), overcoming the deficiencies of Nakamura. Therefore the argument is not persuasive.

15. Applicant's arguments with respect to claims 3-4,22-23 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

16. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to José H Alcalá whose telephone number is (703) 305-9844, and after 02/05/2004 the calls should be directed to (571) 272-1926. The examiner can normally be reached on Monday to Friday.

18. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (703) 308-1233, and after 01/12/2004 the calls should be directed to (571) 272-1957. The examiner can normally be reached on Monday to Friday. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JHA
November 30, 2003

EVAN PERT
PRIMARY EXAMINER